

GOOD PRACTICE IN BANDING FOR SUPPLIERS OF STEEL COILS

This document describes the conditions to ensure that the steel coils supplied to Layde Steel slu (LAYDE) by its suppliers have been sufficiently banded/packages to minimise the risk of damage during handling, storage and transport. It does not include the requirements to ensure the quality of the product and its protection against corrosion, humidity, etc.

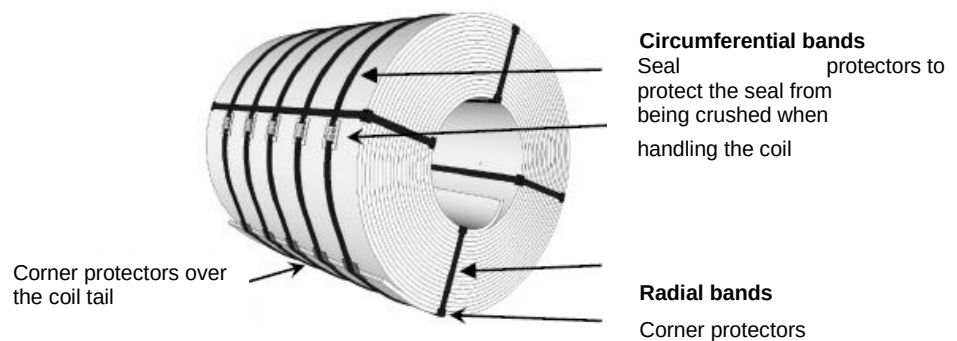
This document is not intended to establish contractual obligations for steel coil suppliers, but we expect that it will at least serve as a reference for them to progressively improve the safety and integrity of steel coil packaging.

Minimum banding requirements

The supplier of steel coils should establish procedures to ensure that the correct specification of banding/package material and the quantity of elements required are applied so that the coils remain in stable condition at all times.

The minimum number of circumferential and radial bands for coils of different yield stresses, thicknesses and sizes is indicated at the end of this document.

The picture below shows the different bands according to their position in the coil (circumferential and radial), with an indication of good banding practices.



Spring Back coil

A spring back coil is defined as having enough energy to cause the tail end to spring with significant force when containment of the energy is removed. The tail-end can spring completely over the coil, or when the coil is free to move (e.g. hanging in a crane), the energy might cause the coil to unwind violently. 2 kJoules of stored energy has been taken as the meaningful definition of a spring back coil (see tables at the end of this document).

Steel banding joints

There are different types of steel banding joints:

- Single or double notch seals.



If this method of sealing is used, coils with a risk of 'spring effect' should be strapped circumferentially with double notch joints.

- Crimp seals.



This type of sealing should not be used for coils with a risk of 'spring effect'.

- Welded joints.



If this method of sealing is used, coils with a risk of 'spring effect' should be strapped circumferentially with systems of at least two welding spots.

- Sealless joints.



If this method of sealing is used, coils with a risk of 'spring effect' should be strapped circumferentially with systems of at least three pairs of punches.

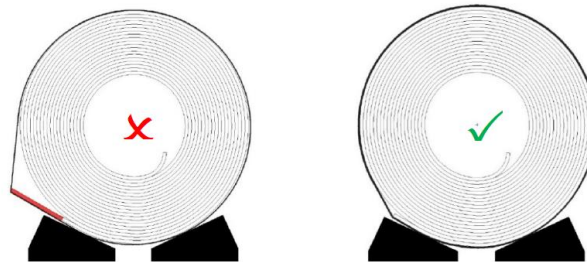
Banding equipment, competent people and management of change

The supplier of steel coils should ensure that

- the equipment used for banding at its premises is suitable for this purpose, complies with the applicable regulations, and is maintained in accordance with the specifications of the manufacturers of this equipment, keeping record of this maintenance,
- the personnel who carry out banding operations at its premises are trained and competent to do so, keeping record of this training,
- a management of change process is applied for changes to coil banding activities.

Ensuring banding integrity

For coils with a risk of 'spring effect', it's necessary to make sure that the length/geometry of the outer tail of the coil does not significantly weaken the banding, ensuring that the tail follows the radius of the coil. For example, this can be achieved by turning the coil to make sure that its own weight compresses the coil tail.



Banding tension: the ideal tension in a steel band when the joint is made is between 30% and 50% of the breaking strength of the strap. Over-tensioning can weaken the band and under-tensioning can result in loose bands during handling operations. Manufacturer's specifications and procedures must be followed to ensure banding equipment is operated to achieve the correct level of tension.

The supplier of steel coils should ensure that

- its personnel carry out the necessary controls to check the integrity of bands and joints, prior to shipment,
- a final check is made to verify the correct number and type of bands according to the material to be supplied. No coils will be sent in which it is detected that the banding or joints are defective or insufficient,
- systems are set up to periodically monitor the integrity and strength of joints. In the event of detecting defective banding on coils already sent, the supplier must inform LAYDE of this situation as soon as possible, identifying the coil or coils affected.

Positioning of the outer tail of the coil

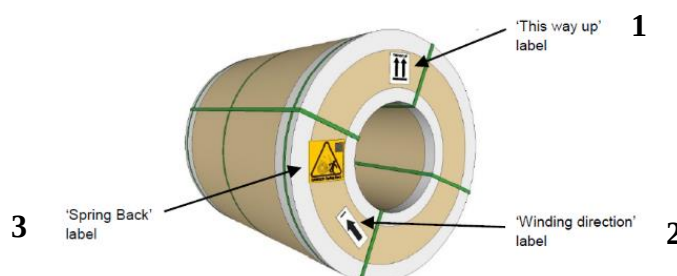
The outer tail of the coil should be supplied positioned in origin between 7 and 8 o'clock (or 4 and 5, depending on the position of the observer).

Safety related labelling of coils

In the case of steel coils with a risk of 'spring effect', the supplier must identify the coils with indications or labels warning of this danger.

For steel coils with external packaging, it would be necessary to add the indications shown in the following image:

1. Label for correct storage position of the coil.
2. Label indicating the winding direction of the steel coil.
3. 'Spring effect' risk warning label, if applicable.



Risk classification of steel coils according to their stored energy

The risk classification is based on the calculation of maximum stored energy in coils with external diameters between 1000 and 2200 mm:

- Very low risk: up to 0.1 kJ.
- Low risk: between 0.1 and 2 kJ.
- **Medium Risk**: between 2 and 18 kJ → **Spring Back Risk**
- **High Risk**: over 18 kJ → **Spring Back Risk**

Key:	1 band	2 bands	3 bands	4 bands	5 bands	6 bands	7 bands
Risk Rating:	LOW		MEDIUM		HIGH		

Minimum number of circumferential bands for hot-rolled steel coils

The minimum number of circumferential bands for hot-rolled steel coils should be in any case 3 units, regardless of their yield stress, width or thickness.

Note: Based on 31.8 mm x 0.8 mm high strength strip, with a minimum of 23.5 kN tensile strength.

Minimum number of circumferential bands for cold-rolled steel coils

The minimum number of circumferential bands for cold-rolled steel coils is detailed in the following tables, depending on their yield stress, width and thickness.

Note: Based on 31.8 mm x 0.8 mm high strength strip, with a minimum of 23.5 kN tensile strength.

Yield stress up to 300 MPa					
	Max. Coil Width (mm)				
Gauge (mm)	600	900	1200	1500	1800
<= 1.0	1	1	1	1	1
<= 1.5	1	1	1	1	1
<= 2.5	2	2	2	2	3
<= 4.0	2	2	3	3	3
<= 6.0	2	3	3	3	3
<= 8.0	3	3	3	3	3

Yield stress up to 400 MPa					
	Max. Coil Width (mm)				
Gauge (mm)	600	900	1200	1500	1800
<= 1.0	1	1	1	1	1
<= 1.5	1	1	1	1	1
<= 2.5	2	2	2	3	3
<= 4.0	3	3	3	3	4
<= 6.0	3	4	4	4	4
<= 8.0	3	4	4	4	5

Yield stress up to 600 MPa					
	Max. Coil Width (mm)				
Gauge (mm)	600	900	1200	1500	1800
<= 1.0	1	1	1	1	1
<= 1.5	1	1	1	1	1
<= 2.5	2	2	3	3	3
<= 4.0	3	3	3	4	4
<= 6.0	4	4	4	5	5
<= 8.0	4	5	5	6	6

Yield stress up to 800 MPa					
	Max. Coil Width (mm)				
Gauge (mm)	600	900	1200	1500	1800
<= 1.0	1	1	1	1	1
<= 1.5	1	1	1	1	1
<= 2.5	2	2	3	3	3
<= 4.0	3	3	4	4	4
<= 6.0	4	4	5	5	5
<= 8.0	5	5	6	6	7

Minimum number of radial bands

The minimum number of radial bands should be in any case 5 units, regardless of their yield stress, width or thickness, or cold/hot rolling.